

CLAIMS

What is claimed:

1 1. An immersive scanning device for imaging a scene comprising:
2 a head unit configured to receive an image light beam and generate an image data
3 signal, said head unit comprising a rotating mirror for receiving said image light
4 beam and an optical receiver for receiving said image light beam from said mirror
5 and outputting said image pixel data signal in response thereto, said image data
6 signal comprises a pixel image signal and a pixel distance signal; and
7 a support unit for supporting and rotating said head unit.

1 2. The immersive scanning device of claim 1, wherein said optical receiver
2 further comprises a distance generation unit for generating said pixel distance data signal.

1 3. The immersive scanning device of claim 2, wherein said distance
2 generation unit comprises a distance detection unit for generating said pixel distance data
3 signal.

1 4. The immersive scanning device of claim 1, wherein said optical receiver
2 further comprises a two dimensional imager for generating a depth image representative
3 of the distance of an object depicted by said pixel image signal from said head unit.

1 5. The immersive scanning device of claim 1, wherein said depth image
2 comprises a polar plot depicting the distance of a plurality of objects represented by said
3 pixel image signal from said head unit.

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1 6. The immersive scanning device of claim 2, wherein said image pixel data
2 represents one pixel of captured image data.

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1 7. The immersive scanning device of claim 6, wherein said pixel distance
2 data represents the distance of an object depicted by said pixel from said head unit.

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1 8. The immersive scanning device of claim 2, further comprising a control
2 system for controlling said head unit and said support unit.

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1 9. The immersive scanning device of claim 2, wherein said optical receiver
2 comprises an imager for receiving said image light beam and generating said pixel image
3 data.

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1 10. The immersive scanning device of claim 9, wherein said imager comprises
2 a photomultiplier tube(PMT).

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1 11. The immersive scanning device of claim 9, wherein said imager comprises
2 a plurality of imagers.

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1 12. The immersive scanning device of claim 2, further comprising a motor for
2 rotating said mirror in accordance with said control system.

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1 13. The immersive scanning device of claim 2, wherein said optical receiver
2 further comprises an aperture screen for limiting the amount of said image light beam that
3 is received by said imager.

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1 14. The immersive scanning device of claim 13, wherein said aperture screen
2 comprises an aperture of a predetermined size and shape.

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1 15. The immersive scanning device of claim 13, wherein said aperture
2 comprises a square shaped aperture.

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1 16. The immersive scanning device of claim 12, wherein said mirror
2 comprises a 45° angled mirror.

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1 17. The immersive scanning device of claim 12, wherein said motor rotates
2 between 1000 and 12,000 revolutions per minute during an image capture operation.

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1 18. The immersive scanning device of claim 2, further comprising a user
2 interface for inputting control variable information.

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1 19. The immersive scanning device of claim 18, wherein said user interface
2 comprises a graphical user interface (GUI).

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1 20. The immersive scanning device of claim 17, wherein said pixel image
2 signal comprises data representative of a plurality of pixels captured during one
3 revolution of said mirror.

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1 21. The immersive scanning device of claim 17, wherein said pixel image
2 signal comprises data representative of 64,000 pixels captured during one revolution of
3 said mirror.

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1 22. The immersive scanning device of claim 17, wherein said camera support
2 further comprises a sweep motor for rotating said head unit about a predetermine axis of
3 rotation.

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1 23. The immersive scanning device of claim 22, wherein said sweep motor is
2 controlled by said control system.

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1 24. A method of capturing an immersive representation of a scene comprising
2 the steps of:
3 generating a distance detection light beam;
4 transmitting said distance detection light beam toward an object within a scene;
5 receiving an image light beam reflected from said object;
6 receiving said distance light beam reflected from said object;
7 providing a limited portion of said image light beam to an imager to produce an
8 image pixel signal representative of a portion of said scene; and
9 providing said distance light beam reflected from said object to a position sensing
10 device to produce a distance signal representative of the distance of said object as
11 depicted by said image pixel signal from a predetermined point.

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1 25. The method of claim 24, further comprising the step of outputting said
2 image pixel data signal and said pixel distance signal as an image data signal.

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1 26. The method of claim 24, further comprising the step of storing said image
2 data signal to a storage medium.

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1 27. The method of claim 24, wherein said step of providing comprises the step
2 of providing a limited portion of said image light beam to an imager to produce a
3 plurality of image pixel signals representative of one pixel of said scene.

1 28. The method of claim 24, wherein said portion of said scene comprises a
2 single pixel.

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1 29. An immersive scanning device for imaging a scene comprising:
2 a head unit receiving an image light beam and generating an image data signal;
3 a support unit for supporting and rotating said head unit;
4 said head unit comprises a rotating mirror for receiving said image light beam;
5 an optical receiver for receiving said image light beam from said mirror and
6 outputting said image pixel data signal in response thereto; and
7 a control system for controlling the rotation of said head unit and said mirror in
8 accordance with predetermined control variable information.

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1 30. An immersive scanning device according to claim 29, further comprising a
2 user interface for inputting said control variable information.

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1 31. An immersive scanning device according to claim 29, further comprising a
2 storage memory for storing sad control variable information.

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1 32. An immersive scanning device according to claim 30, wherein said user
2 interface comprises a graphical user interface.

1 33. An immersive scanning device according to claim 30, wherein said optical
2 receiver comprises an imager responsive to an image light beam for generating a image
3 pixel data signal.

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1 34. An immersive scanning device according to claim 33, wherein said optical
2 receiver further comprises an aperture screen for limiting the amount of image light that
3 is received by said imager.

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1 35. An immersive scanning device according to claim 34, wherein said optical
2 receiver further comprises a focusing lens for focusing an image light beam onto said
3 aperture screen.

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1 36. An immersive scanning device according to claim 35, wherein said optical
2 receiver further comprises a distance detection unit for detecting the distance of an object
3 relative to said head unit.

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1 37. An immersive scanning device according to claim 36, wherein said imager
2 comprises a photomultiplier tube (PMT).

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1 38. An immersive scanning device according to claim 37, wherein said head
2 unit further comprises a scan motor for rotating said mirror in accordance with a signal
3 from said control system.

1 39. An immersive scanning device according to claim 38, wherein said
2 support unit further comprises a sweep motor for rotating said head unit in accordance
3 with a signal from said control system.

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1 40. An immersive scanning device according to claim 39, further comprising
2 an image data storage unit for storing image pixel data representative of a captured scene.

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